17 DESIGN CAPACITY TABLES

The following Design Capacity Tables are provided, derived using DESIGN CHECK NOS 1 TO 9 inclusive

Column stiffening requirements must be separately assessed using DESIGN CHECK NOS 10 to 15 inclusive.

Design of column stiffeners can be carried out using DESIGN CHECK NOS 16 to 24 inclusive.

17.1 Four bolt unstiffened end plate

Table 7 Design moment capacity of connection ϕM_{conn}
Four bolt unstiffened end plate—M24 bolts 8.8/TB category threads included in shear plane—Unhaunched welded beam/universal beam sections > 300 mm deep

Table 8 Design moment capacity of connection ϕM_{conn}
Four bolt unstiffened end plate—M20 bolts 8.8/TB category threads included in shear plane—Unhaunched universal beam sections > 200 mm deep

Table 9 Design moment capacity of connection ϕM_{conn}
Four bolt unstiffened end plate—M24 bolts 8.8/TB category threads included in shear plane—Haunched universal beam sections > 300 mm deep

Table 10 Design moment capacity of connection ϕM_{conn}
Four bolt unstiffened end plate—M20 bolts 8.8/TB category threads included in shear plane—Haunched universal beam sections > 200 mm deep

17.2 Four bolt stiffened end plate

Table 11 Design moment capacity of connection ϕM_{conn}
Four bolt stiffened end plate—M24 bolts 8.8/TB category threads included in shear plane—Unhaunched welded beam/universal beam sections > 300 mm deep

Table 12 Design moment capacity of connection ϕM_{conn}
Four bolt stiffened end plate—M20 bolts 8.8/TB category threads included in shear plane—Unhaunched universal beam sections > 200 mm deep

17.3 Six bolt unstiffened end plate

Table 13 Design moment capacity of connection ϕM_{conn}
Six bolt unstiffened end plate—M24 bolts 8.8/TB category threads included in shear plane—Unhaunched welded beam/universal beam sections > 450 mm deep

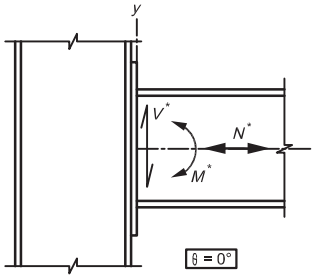
Table 14 Design moment capacity of connection ϕM_{conn}
Six bolt unstiffened end plate—M20 bolts 8.8/TB category threads included in shear plane—Unhaunched universal beam sections > 350 mm deep

17.4 Eight bolt stiffened end plate

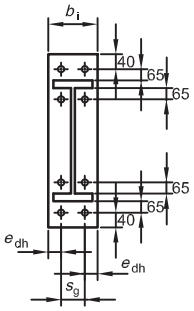
Table 15 Design moment capacity of connection ϕM_{conn}
Eight bolt stiffened end plate—M24 bolts 8.8/TB Category threads included in shear plane—Unhaunched welded beam and universal beam sections > 520 mm deep

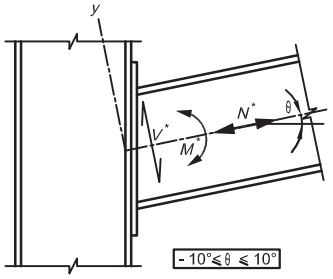
TABLE 7

DESIGN MOMENT CAPACITY OF CONNECTION ϕM_{conn}
FOUR BOLT UNSTIFFENED END PLATE
M24 BOLTS 8.8/TB CATEGORY THREADS INCLUDED IN SHEAR PLANE
UNHAUNCHED WELDED BEAM/UNIVERSAL BEAM SECTIONS > 300 MM DEEP
(TABLE DEVELOPED USING THICK PLATE THEORY)



CASE 1





CASE 2

							CASE 1		CASE 2 θ≠0, N^*≠0		
		Welds		Grade 250 plate			Max V* (plus or minus)	θ=0, N^*=0	Max V^* (plus or minus)	Max N^* (Tens or Comp)	ϕM_{conn} Refer Note
Section, Grade 300	ϕM_s	Flange	Web	Width	Thickness	Gauge		ϕM_{conn}			
	kNm			b_i	t_i	s_g	kN	kNm	kN	kN	kNm
700WB130	1210	FPBW	8	270	28	170	532	636	165	224	557*
700WB115	1020	FPBW	8	270	28	170	532	632	165	197	563
610UB125	927	FPBW	8	250	28	170	399	554	177	201	492
610UB113	829	FPBW	8	250	28	170	343	551	165	182	495
610UB101	782	FPBW	8	250	28	170	222	549	165	175	495
530UB92.4	640	FPBW	10	230	28	150	531	484	140	159	441
530UB82.0	558	FPBW	10	230	28	150	525	481	131	142	444
460UB82.1	496	FPBW	10	220	28	140	472	415	118	141	383
460UB74.6	449	FPBW	10	220	28	140	431	414	108	128	385
460UB67.1	399	FPBW	8	220	28	140	400	399	100	116	386
410UB59.7	324	FPBW	8	220	28	140	328	324	328	103	324
410UB53.7	304	FPBW	8	220	28	140	317	304	317	99.0	304
360UB56.7	273	FPBW	8	220	28	140	297	273	297	98.0	273
360UB50.7	242	FPBW	8	220	25	140	269	242	269	87.5	242
360UB44.7	222	FPBW	8	220	25	140	251	222	252	82.5	222
310UB46.2	197	FPBW	6	220	25	140	213	197	213	80.0	197
310UB40.4	182	FPBW	6	220	25	140	191	182	192	75.0	182

NOTES:

ϕM_s = design section moment capacity, ϕM_{conn} = design moment capacity of connection.

* indicates ϕM_{conn} is less than recommended minimum of 0.5 (ϕM_s).

Case 1 applies to straight flexural member splices (i.e. θ=0) with no axial force (N^*=0).

Case 2 applies to connections where θ is within the range –10 to 10 degrees, and design axial force (N^*) does not exceed the value tabulated (approx 5% of design section capacity). Axial/moment combination to be checked separately, for the beam section.

Minimum design shear force (V^*) is the **MAXIMUM** of $0.15\phi V_v$ (design shear capacity) and 40 kN.

Maximum V^* limited to $0.6\phi V_v$ to ensure M^*, V^* combination is satisfied for the beam section.

Welds: E48XX/W50X electrodes assumed.
Fillet weld size given is minimum required, a larger size or FPBW may be used.
FPBW = full penetration butt weld. All welds Category SP.

Horizontal edge distance $e_{dh} = (b_i - s_g) / 2$; different for each section size but always ≥ 36 mm.

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